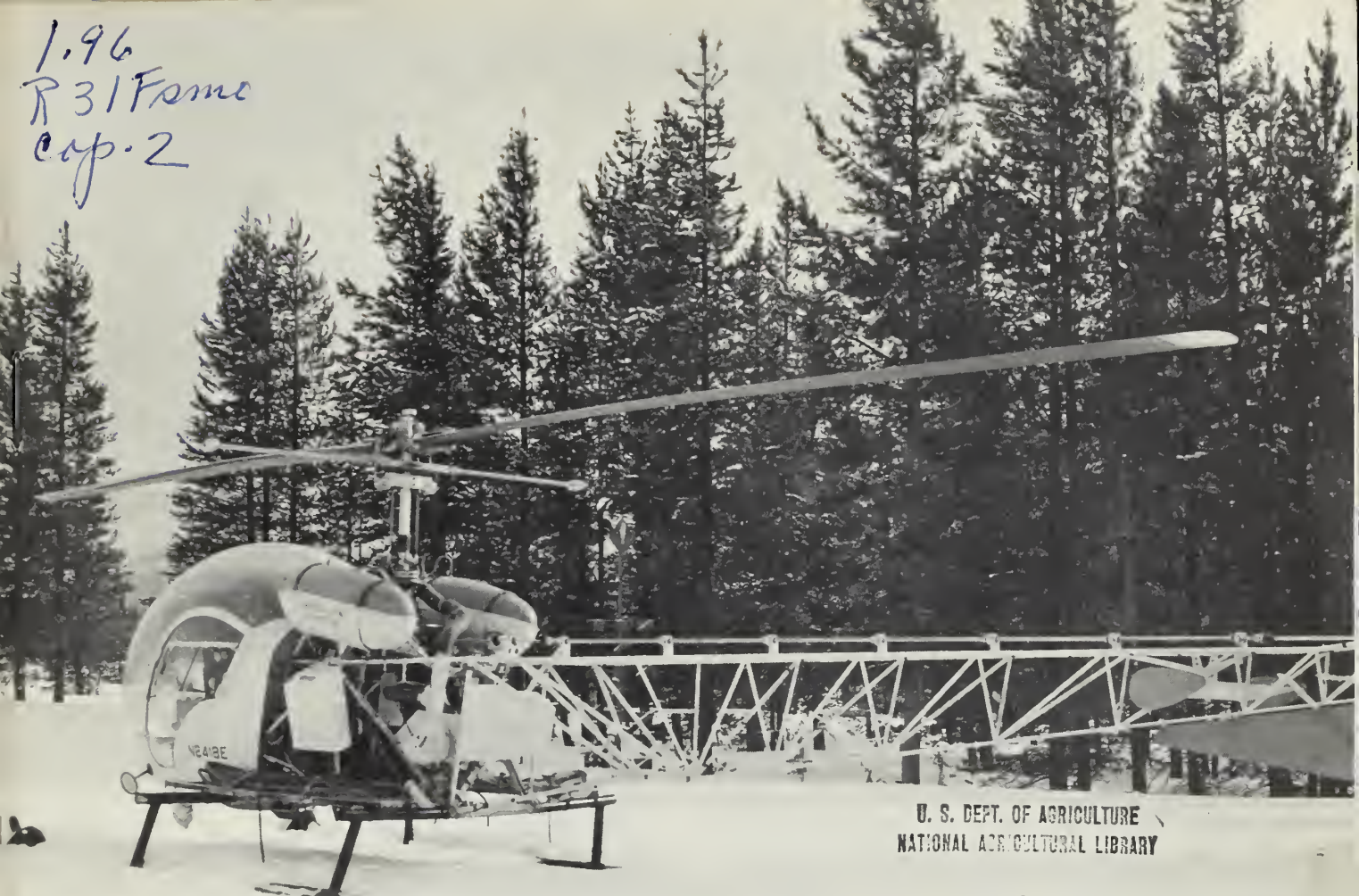


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JUN 2 - 1965

CURRENT SERIAL RECORDS

**WATER SUPPLY OUTLOOK**  
and  
**FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS**  
for  
**MONTANA**

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE.  
and  
MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

||||||| AS OF |||||||  
**MAY 1, 1965**

# UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

## *To Recipients of Water Supply Outlook Reports:*

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from advance estimates of the streamflow.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, up to 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

Streamflow forecasts are obtained by a comparison of total or maximum snow accumulation, as measured by snow water equivalent, to the subsequent spring and summer or snowmelt season runoff over a period of years. The snow water equivalent measured in selected snow courses provides most of the index to the streamflow forecast for the following season. More accurate forecasts are usually obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast procedure. Early season forecasts assume average climatic conditions through the snowmelt season.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions. Soil Conservation Service Reports may be secured from Soil Conservation Service, 511 N.W. Broadway - Room 507, Portland, Oregon 97209.

## PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
<b>RIVER BASINS</b>			
WESTERN UNITED STATES _____	MONTHLY (FEB.-MAY) _____	PORTLAND, OREGON _____	ALL COOPERATORS
BASIC DATA SUMMARY _____	OCTOBER 1 _____	PORTLAND, OREGON _____	ALL COOPERATORS
<b>STATES</b>			
ALASKA _____	MONTHLY (MAR.-MAY) _____	PALMER, ALASKA _____	ALASKA S.C.D.
ARIZONA _____	SEMI-MONTHLY _____ (JAN. 15 - APR. 1)	PHOENIX, ARIZONA _____	SALT R. VALLEY WATER USERS ASSOC. ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO _____	MONTHLY (FEB.-MAY) _____	FORT COLLINS, COLORADO _____	COLO. STATE UNIVERSITY COLO. STATE ENGINEER N. MEX. STATE ENGINEER
IDAHO _____	MONTHLY (JAN.-JUNE) _____	BOISE, IDAHO _____	IDAHO STATE RECLAMATION ENGINEER
MONTANA _____	MONTHLY (JAN.-JUNE) _____	BOZEMAN, MONTANA _____	MONT. AGR. EXP. STATION
NEVADA _____	MONTHLY (JAN.-MAY) _____	RENO, NEVADA _____	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES - DIVISION OF WATER RESOURCES
OREGON _____	MONTHLY (JAN.-JUNE) _____	PORTLAND, OREGON _____	OREG. STATE UNIVERSITY OREGON STATE ENGINEER
UTAH _____	MONTHLY (JAN.-JUNE) _____	SALT LAKE CITY, UTAH _____	UTAH STATE ENGINEER
WASHINGTON _____	MONTHLY (FEB.-JUNE) _____	SPOKANE, WASHINGTON _____	WN. STATE DEPT. OF CONSERVATION
WYOMING _____	MONTHLY (FEB.-JUNE) _____	CASPER, WYOMING _____	WYOMING STATE ENGINEER

## PUBLISHED BY OTHER AGENCIES

<u>REPORTS</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA _____	MONTHLY (FEB.-JUNE) _____	WATER RESOURCES SERVICE, DEPT. OF LANDS, FOREST AND WATER RESOURCES, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA _____	MONTHLY (FEB.-MAY) _____	CALIF. DEPT. OF WATER RESOURCES, P.O. BOX 388, SACRAMENTO, CALIF.

WATER SUPPLY OUTLOOK  
FEDERAL-STATE-PRIVATE COOPERATIVE SNOW SURVEYS  
for  
MONTANA

Report Prepared  
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Bozeman, Montana





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CHAPTER 1

The first chapter of the book is devoted to a general introduction to the subject. It begins with a discussion of the importance of the subject and the scope of the book. The chapter then proceeds to a discussion of the basic principles of the subject, and finally to a discussion of the methods of investigation. The chapter concludes with a summary of the main points of the chapter.



MONTANA  
WATER SUPPLY OUTLOOK  
as of  
May 1, 1965

\* \* \* \* \*

\* The outlook for irrigation and domestic water  
\* supplies is good to excellent. High elevation  
\* snow still contains near record amounts of  
\* water. Melt is occurring at low and median  
\* elevations. Late season streamflow is expected  
\* to hold up well through the summer months.  
\*

\* Streamflow for the next five months is forecast  
\* at about 20 to 40 percent above average. Spring  
\* runoff is not expected to cause much damage  
\* unless warm heavy rains occur during the main  
\* snow melt period. Generally, reservoir levels  
\* have been lowered to help reduce peak flows.  
\*

\* \* \* \* \*

West of the divide, snow cover averages about the same as a year ago and is about 20 to 30 percent above average except on the Kootenai where it is near average. High elevation snow continues to increase or remain at about the same water content as a month ago. The snow is very dense and on many snow courses two inches of snow contains about one inch of water.

East of the divide, snow cover is 10 to 40 percent greater than a year ago and 40 to 80 percent above average on the Missouri and Yellowstone headwaters. The headwater area of the Marias and Sun Rivers along the Continental Divide has a snow pack that is about 10 percent above average and about the same as a year ago. Along the main stem of the Missouri River, from Toston to Fort Benton, tributary streams have a snow cover about 5 percent less than a year ago and about 40 percent above average. All high elevation snow courses continue to show a dense snow pack.

Runoff during April was a little above average on the Kootenai River, about 15 to 25 percent above average on Flathead River tributaries, and 35 to 65 percent above average on the Bitterroot, Upper Clark Fork and Blackfoot drainages. Runoff for the next five months is forecast to be near average on the Kootenai River and its tributaries in Montana, 15 to 25 percent above average on the Flathead River tributaries, and 25 to 30 percent above average on the Upper Clark Fork drainages.



East of the divide, runoff during April was near average from the higher elevation tributaries. Above average flows occurred on the Jefferson and Marias Rivers tributaries. The Milk River above Fresno Reservoir produced about two and one-half times its average runoff in April.

Runoff for the next five months is forecast to be 20 to 40 percent above average on headwaters of the Missouri River except runoff near 50 percent above average is expected on the Red Rock River. Tributaries to the Missouri River originating along the Continental Divide are forecast 15 to 20 percent above average. Streams originating in the Crazy, Belt, Castle and Snowy Mountains in central Montana are expected to produce 35 to 50 percent above average runoff. Below average runoff is forecast for the Milk River. However, reservoirs were filled during the April runoff and diversions from the St. Mary River should satisfy irrigation requirements. The Yellowstone River and its tributaries originating in the Absarokee and Beartooth Mountains are forecast 20 to 35 percent above average. Natural runoff from the Big Horn River in Wyoming is forecast about 40 percent above average, but reservoirs have been drawn down to control spring runoff and streamflow below reservoirs may not indicate the high runoff.

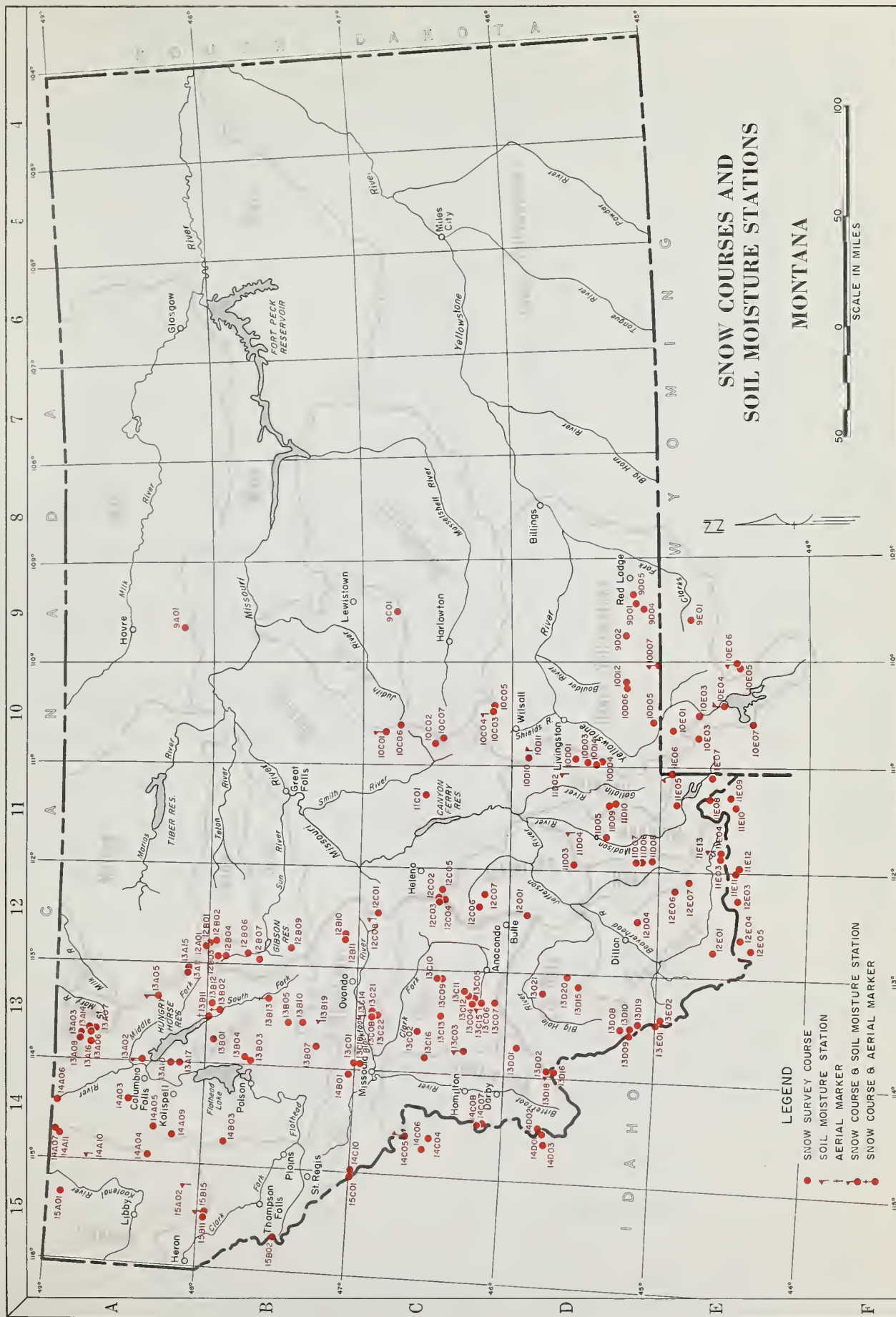
High water during spring runoff is not expected to cause much damage unless warm heavy rains occur during the main snow melt period. The heavy high elevation snow is not seen as a great flood threat. High elevation runoff can add to peak flows but is normally not a major factor. Usually, severe conditions are generated by heavy rains falling on the low and median elevation snow pack.

Soil moisture at low and median elevations is generally near or over field capacity as a result of recent snow melt. Higher elevation soils are not saturated as very little melt has occurred.

Reservoirs are generally being regulated to control spring runoff and help reduce peak flows.







## 1965 INDEX to MONTANA SNOW COURSES and SOIL MOISTURE STATIONS

## SOIL MOISTURE STATIONS

Drainage Basin & Course Name	Number	Elev.	Sec.	Top.	Range	Record Begin	Measuring Dates	Mass. By
COLUMBIA RIVER BASIN								
KOOTENAI RIVER								
Bare Trail	13813	5500	36	26N	31W	1966	3-4-5, 5-1	2
Bare Trail	13815	3800	5	25N	30W	1964	3-4-5, 5-1	1
Bare Trail	14410H	3000	5	34N	25W	1964	3-4-5, 5-1	1
Graves Creek	14011	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14012	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14013	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14014	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14015	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14016	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14017	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14018	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14019	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14020	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14021	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14022	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14023	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14024	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14025	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14026	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14027	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14028	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14029	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14030	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14031	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14032	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14033	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14034	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14035	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14036	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14037	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14038	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14039	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14040	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14041	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14042	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14043	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14044	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14045	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14046	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14047	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14048	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14049	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14050	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14051	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14052	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14053	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14054	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14055	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14056	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14057	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14058	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14059	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14060	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14061	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14062	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14063	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14064	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14065	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14066	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14067	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14068	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14069	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14070	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14071	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14072	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14073	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14074	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14075	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14076	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14077	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14078	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14079	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14080	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14081	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14082	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14083	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14084	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14085	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14086	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14087	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14088	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14089	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14090	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14091	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14092	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14093	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14094	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14095	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14096	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14097	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14098	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14099	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14100	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14101	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14102	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14103	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14104	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14105	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14106	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14107	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14108	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14109	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14110	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14111	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14112	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14113	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14114	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14115	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14116	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14117	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14118	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14119	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14120	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14121	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14122	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14123	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14124	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14125	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14126	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14127	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14128	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14129	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14130	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14131	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14132	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14133	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14134	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14135	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14136	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14137	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14138	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14139	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14140	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14141	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14142	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14143	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
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Graves Creek	14145	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14146	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14147	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek	14148	4200	12	36N	26W	1937	3-4-5, 5-1	1, 2
Graves Creek								

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geologist Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. Montana State Forestry School
9. Donelson Water & Power Bureau
10. Bureau of Sport Fisheries & Wildlife

M - Soil Moisture

# WATER SUPPLY FORECASTS

AS OF MAY 1, 1965

(1000 Acre Feet)

		FORECAST		PERCENT	MEASURED FLOW	
NO.	RIVER AND FORECAST POINT	PERIOD	THIS YEAR	AVERAGE	LAST YEAR*	AVERAGE
CLARK FORK RIVER						
3404	Milltown (above)(14)	May-Sept	900	131	917	686
		May-July	700	131	794	589
		May-June	643	131	661	490
3405	Missoula (above)	May-Sept	2,090	131	1,960	1,600
		May-July	1,835	131	1,736	1,405
		May-June	1,543	131	1,469	1,180
3530	Missoula (below)	May-Sept	3,855	129	3,615	2,984
		May-July	3,465	129	3,238	2,681
		May-June	2,933	130	2,690	2,263
3545	St. Regis (at)	May-Sept	5,060	125	4,717	4,036
		May-July	4,550	125	4,218	3,624
		May-June	3,840	125	3,510	3,066
3890	Plains (near)(18)	May-Sept	13,560	120	13,180	11,286
		May-July	12,320	120	11,892	10,230
		May-June	10,300	120	9,856	8,570
3920	Whitehorse Rapids (at)(19)	May-Sept	15,100	120	14,530	12,580
		May-July	13,650	120	13,064	11,369
		May-June	11,400	120	10,819	9,499
WEST FORK BITTERROOT RIVER						
3425	Conner (near)(15)	May-Sept	200	127	233	157
		May-July	186	127	216	146
BITTERROOT RIVER						
3440	Darby (near)	May-Sept	656	127	695	518
		May-July	608	127	673	478
		May-June	525	127	566	414
3528	Missoula (at)(16)	May-Sept	1,765	128	1,655	1,384
		May-July	1,630	128	1,502	1,277
		May-June	1,390	128	1,221	1,084
BLODGETT CREEK						
3475	Corvallis (near)	May-Sept	51.0	128		39.9
		May-July	48.5	128		37.9

- (14) Difference in observed flow, Clark Fork above Missoula & Blackfoot near Bonner.  
 (15) Adjusted for storage in Painted Rocks Reservoir.  
 (16) Difference in observed flow, Clark Fork above and below Missoula.  
 (18) Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.  
 (19) Adjusted for storage in Hungry Horse, Flathead Lake and Noxon Rapids Reservoirs.





# WATER SUPPLY FORECASTS

AS OF MAY 1, 1965

(1000 Acre Feet)

		FORECAST	FORECAST	PERCENT	MEASURED FLOW	
NO.	RIVER AND FORECAST POINT	PERIOD	THIS YEAR	AVERAGE	LAST YEAR*	AVERAGE
MISSOURI RIVER BASIN						
0110	RED ROCK RIVER Kennedy Ranch (at)	May-Sept	73.7	148	72.6	49.8
		May-July	65.7	148	65.8	44.3
0125	Monida (near)(1)	May-Sept	80.0	146	95.4	54.9
		May-July	73.2	146	92.8	50.2
0255	BIG HOLE RIVER Melrose (near)	May-Sept	831	133	788	625
		May-July	770	133	724	576
0330	BOULDER RIVER Boulder (near)	May-Sept	80.6	122	101	66.4
		May-July	77.0	122	96.5	63.2
0345	JEFFERSON RIVER Sappington (at)	May-Sept	1,120	136	1,187	824
		May-July	985	136	1,066	725
0375	MADISON RIVER West Yellowstone (near)	May-Sept	215	120	190	179
		May-July	155	120	140	129
0385	Grayling (near)(2)	May-Sept	447	123	426	364
		May-July	338	123	332	274
0410	McAllister (near)(3)	May-Sept	780	125	784	623
		May-July	600	125	626	481
0435	GALLATIN RIVER Gateway (near)	May-Sept	536	128	527	418
		May-July	452	128	451	353
0485	BRIDGER CREEK Bozeman (near)	May-Sept	21.5	130	21.8	16.5
		May-July	19.8	130	20.1	15.3
0500	HYALITE CREEK Bozeman (near)(4)	May-Sept	43.5	133	43.0	32.6
		May-July	37.0	133	37.3	27.8
0525	GALLATIN RIVER Logan (at)	May-Sept	567	142	568	400
		May-July	470	142	470	330

(1) Adjusted for storage in Lima Reservoir.

(2) Adjusted for storage in Hebgen Lake.

(3) Adjusted for storage in Hebgen and Ennis Lakes.

(4) Adjusted for storage in Middle Creek Reservoir.



# WATER SUPPLY FORECASTS

AS OF MAY 1, 1965

(1000 Acre Feet)

		FORECAST		PERCENT	MEASURED FLOW	
NO.	RIVER AND FORECAST POINT	PERIOD	THIS YEAR	AVERAGE	LAST YEAR*	AVERAGE
MISSOURI RIVER						
0545	Toston (at)(3)	May-Sept	2,400	132	2,433	1,816
		May-July	2,020	132	2,102	1,530
0908	Fort Benton (at)(5)	May-Sept	3,740	130	4,520	2,861
		May-July	3,080	130	3,838	2,367
1095	Virgelle (at)(6)	May-Sept	4,500	127	5,684	3,557
		May-July	3,800	127	5,073	2,999
1150	Zortman (near)(6)	May-Sept	5,000	129	6,296	3,885
		May-July	4,180	129	5,566	3,254
1320	Fort Peck Dam (below)(7)	May-Sept	4,850	130	6,075	3,728
		May-July	4,150	130	5,547	3,200
1770	Wolf Point (near)(7)	May-Sept	5,060	128		3,942
		May-July	4,330	128		3,380
3300	Williston, N.D. (near)(8)	May-Sept	12,200	131	13,100	9,299
		May-July	10,600	131	11,953	8,068
PRICKLY PEAR CREEK						
0615	Clancy (near)	May-Sept	23.0	121	33.3	19.0
		May-July	19.7	121	28.4	16.2
SUN RIVER						
0786	Gibson Dam (at)(10)	May-Sept	700	122	721	573
		May-July	636	122	674	522
0920	TWO MEDICINE CREEK					
	Browning (near)(20)	May-Sept	290	120	293	241
		May-July	276	120	279	229
BADGER CREEK						
0925	Browning (near)	May-Sept	152	115	184	132
		May-July	129	115	166	112
CUT BANK CREEK						
0990	Cut Bank (at)	May-Sept	134	111	136	121
		May-July	112	111	125	101
MARIAS RIVER						
0995	Shelby (near)(9)	May-Sept	657	116	783	564
		May-July	616	116	746	530

- (3) Adjusted for storage in Hebgen and Ennis Lakes.
- (5) Adjusted for storage in Canyon Ferry Reservoir.
- (6) Adjusted for storage in Canyon Ferry and Tiber Reservoirs.
- (7) Adjusted for storage in Canyon Ferry, Tiber and Fort Peck Reservoirs.
- (8) Adjusted for storage in Canyon Ferry, Tiber, Fort Peck, Buffalo Bill and Boysen Reservoirs.
- (9) Adjusted for storage in Two Medicine, Four Horns, Lake Frances and Swift Reservoirs.
- (10) Adjusted for storage in Gibson Reservoir and diversions.
- (20) Adjusted for storage in Two Medicine Reservoir and diversions into Two Medicine Canal.

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\* PROVISIONAL DATA FURNISHED BY U.S. GEOLOGICAL SURVEY

NOTE: ALL AVERAGES BASED ON 1948-1962 (15 YEAR PERIOD).





# WATER SUPPLY FORECASTS

AS OF MAY 1, 1965

(1000 Acre Feet)

		FORECAST		PERCENT	MEASURED FLOW	
NO.	RIVER AND FORECAST POINT	PERIOD	THIS YEAR	AVERAGE	LAST YEAR*	AVERAGE
SOUTH FORK MUSSELSHELL R.						
1185	Martinsdale (above)	May-Sept	58.0	136	56.4	42.8
		May-July	55.3	136	54.6	40.7
MILK RIVER						
1350	Eastern Crossing (at)	May-Sept	185	90	249	206
YELLOWSTONE RIVER						
1915	Corwin Springs (at)	May-Sept	2,180	122	2,063	1,792
		May-July	1,810	122	1,700	1,487
1925	Livingston (near)	May-Sept	2,470	122	2,308	2,019
		May-July	2,030	122	1,888	1,662
2145	Billings (at)	May-Sept	4,750	129	4,198	3,675
		May-July	4,040	129	3,612	3,124
3090	Miles City (at)(12)	May-Sept	7,000	132		5,307
		May-July	6,080	132		4,609
3295	Sidney (near)(12)	May-Sept	7,100	135		5,245
		May-July	6,250	135		4,625
SHIELDS RIVER						
1935	Clyde Park (at)	May-Sept	122	149	124	82.1
		May-July	112	149	112	75.3
BOULDER RIVER						
2000	Big Timber (at)	May-Sept	447	135	366	330
		May-July	417	135	343	309
STILLWATER RIVER						
2050	Absarokee (near)(11)	May-Sept	725	136	537	531
		May-July	605	136	470	444
CLARKS FORK RIVER						
2075	Chance (at)	May-Sept	673	120	587	560
		May-July	605	120	546	504
2085	Edgar (at)	May-Sept	707	122	621	578
		May-July	620	122	573	507
ROCK CREEK						
2095	Red Lodge (near)	May-Sept	130	129	94.4	101
		May-July	100	129	76.4	77.2

(11) Adjusted for storage in Mystic Lake.

(12) Adjusted for storage in Buffalo Bill and Boysen Reservoirs.





# SNOW SURVEY DATA

AS OF MAY 1, 1965

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

## COLUMBIA RIVER BASIN

### KOOTENAI RIVER

15B11	Baree Creek	5500	4/29	88	45.2	58.8	49.1
15B15	Baree Trail	3800	4/29	0	0.0	-	-
14A04	Brush Creek	5000	4/28	26	10.2	12.4	10.7*
BC 10	Fernie	3500	4/29	7	3.1	3.8	2.8
BC 12A	Field	4200	4/30	0	0.0	0.0	0.6*
BC 11	Glacier	4100	4/30	45	22.6	27.8	25.9
14A11	Graves Creek	4300	4/30	40	16.9	-	-
BC 43	Gray Creek	5100	4/27	53	21.9	23.0	20.2
BC 33	Kicking Horse	5400	4/30	38	14.6	12.1	12.2
BC 20B	Kimberley	3800	4/30	0	0.0	0.3	1.2*
BC 32	Marble Canyon	5000	4/29	31	11.2	10.2	13.4
BC 10B	Morrissey Ridge	6100	4/30	68	28.0	-	-
BC 10A	New Fernie	4100	4/29	19	9.3	11.2	6.0*
15A01	Red Mountain	6000	4/29	52	21.9	16.6	20.9
BC 8A	Sinclair Pass	4500	4/29	0	0.0	1.7	2.2*
BC 20A	Sullivan Mine	5100	4/30	25	11.0	11.5	12.5
BC 41	Upper Elk River	4400	4/26	8	3.0	3.2	2.5*
14A07	Weasel Divide	5450	4/30	80	38.2	37.8	35.7*

### FLATHEAD RIVER

14B03	Bassoo Peak	5150	4/27	19	7.4	8.9	9.7*
13A11	Beaver Lake	5900	5/3	68	32.1	30.9	-
13B03	Big Creek	6750	4/29	119	59.8	51.6	50.5*
13A17	Camp Misery	6400	4/28	138	65.8	57.0	-
13A02	Desert Mountain	5600	4/27	43	20.6	16.5	14.6
13B04	Fatty Creek	5500	4/29	56	26.1	28.0	-
14A09	Griffin Creek Divide	5150	4/28	18	7.5	9.6	9.8*
13B12	Gunsight Lake	6300	5/3	111	50.4	50.9	-
14A03	Hell Roaring Divide	5770	4/30	77	37.5	38.8	31.5
13B13	Holbrook	4530	5/3	0	0.0	5.0	1.4*
14A05	Logan Creek	4300	4/28	4	1.6	4.4	3.4*
13A05	Marias Pass	5250	4/27	65	28.0	16.6	18.0
13A16	Mineral Creek	4000	5/1	39	16.7	21.0	-
13B07	North Fork Jocko	6330	4/30	112	55.0	58.1	48.0*
13B02	Spotted Bear Mountain	7000	5/3	31	14.6	16.5	12.4*
13A10	Strawberry Lake	5600	5/3	103	53.4	53.6	42.5*
13B01	Trinkus Lake	6100	5/3	104	54.4	55.2	45.4*
13B11	Twin Creeks	3580	5/3	0	0.0	9.8	1.4*
13B05	Upper Holland Lake	7000	5/3	90	45.5	46.8	39.0*



# SNOW SURVEY DATA

AS OF MAY 1, 1965

(inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

## CLARK FORK RIVER

13C13	Black Pine	7100	4/27	48	20.2	17.8	11.8*
12B10	Copper Creek	5700	4/26	35	15.6	14.6	-
12B11	Cotter Mine	6250	4/26	53	22.8	18.5	-
13B10	Coyote Hill	4200	4/30	11	5.0	5.2	2.3
13C11	Fred Burr Pass	8000	4/29	91	41.3	30.6	32.5*
14C10	Heart Lake Trail	4800	4/29	38	16.6	-	-
15C01	Hoodoo Creek	6200	4/29	114	56.6	55.2	50.2*
13C04	Intergaard	6450	4/29	24	8.4	9.0	-
15B02	Lookout	5250	4/27	82	36.6	44.3	36.4
13C21	Lubrecht Forest No. 3	5450	5/2	10	3.4	7.9	3.6*
13C22	Lubrecht Forest No. 4	4650	5/2	0	0.0	1.2	0.6*
13C08	Lubrecht Forest No. 6	4040	5/2	0	0.0	0.0	0.1*
13C12	Red Lion	7100	4/29	61	26.2	18.2	19.6*
13C03	Skalkaho Summit	7260	4/27	82	38.4	29.0	26.7*
13C02	Slide Rock Mountain	7100	4/28	50	22.3	21.8	14.7*
13C18	Spring Gulch	6000	5/2	7	3.0	11.0	3.1*
13C07	Storm Lake	7780	4/29	49	20.8	16.8	17.0*
13C01	Stuart Mountain	7400	5/2	86	38.4	36.2	30.4*
14B01	TV Mountain	6800	5/1	53	23.2	22.6	20.3*

## BITTERROOT RIVER

13C16	Ambrose	6480	4/28	38	15.4	16.5	11.0*
13D02	Gibbons Pass	7100	4/30	61	29.2	26.7	23.1
14C05	Lolo Pass	5230	4/27	74	34.8	40.8	31.8*
14C07	Lost Horse	5940	4/27	82	37.3	43.6	34.1*
14D02	Nez Perce Camp	5580	4/26	36	15.7	20.0	9.7
14D01	Nez Perce Pass	6570	4/26	45	19.8	22.6	13.3
13D22	Saddle Mountain	7940	4/30	71	33.3	-	-
14C08	Twin Lakes	6510	4/27	108	52.2	54.9	46.6*



# SNOW SURVEY DATA

AS OF MAY 1, 1965

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

## MISSOURI RIVER BASIN

### BEAVERHEAD RIVER

13B10	Bloody Dick	7600	4/28	37	15.2	12.3	-
12D04	Carter Creek	7400				-	-
13E22	Dad Creek Lake	8400	5/4	57	23.2	-	-
13D15	Elk Horn Springs	7800	4/29	38	15.1	9.6	8.4*
13D09	Gold Stone	8100	4/28	56	22.7	16.8	-
11E04	Lakeview Canyon	6930	4/29	44	19.2	12.1	9.5*
11E03	Lakeview Ridge	7400	4/29	38	16.7	10.1	7.3*
12E01	White Pine Ridge	8850	4/27	23	7.9	8.1	-

### RUBY RIVER

11D08	Clover Meadow	8600	4/27	60	24.0	19.8	-
12E07	Divide	7900	4/27	38	14.7	12.0	-
12E06	Notch	8500	4/27	58	21.2	16.9	-

### BIG HOLE RIVER

13D20	Abundance Lake	8800	4/27	77	32.2	21.4	-
13D19	Darkhorse Lake	8600	4/27	97	41.0	27.7	-
13D21	Foolhen	8280	4/27	67	27.3	18.8	-
13D08	Jahnke Creek	7340	4/28	24	10.0	8.6	-

### JEFFERSON RIVER

12C07	Berry Meadow	7300	4/29	24	9.1	9.4	-
12D01	Pipestone Pass	7200	4/30	14	4.9	6.7	4.4*

### MADISON RIVER

11E09	Big Springs	6500	4/29	42	21.0	18.7	-
11D07	Call Road	8050	4/27	45	15.9	14.2	-
11D06	Crockett Lake	8400	4/27	44	15.5	13.3	-
11D12	Four Mile	6900	4/27	28	10.6	-	-
11E05	Hebgen Dam	6550	4/27	24	10.8	10.3	4.8
11E10	Island Park	6315	4/29	27	11.9	10.1	-
11D11	Lower Twin	7900	4/27	76	31.2	-	-
10E02	Norris Basin	7500	5/3	24	10.1	13.2	5.5*
11E21	Potomageton Park	7150	4/30	34	17.4	-	-
11E20	Sentinel Creek	8300	4/30	79	37.2	-	-
11E08	Valley View	6500	4/29	39	18.6	16.1	-
11E07	West Yellowstone	6700	4/28	27	11.5	8.3	5.6





# SNOW SURVEY DATA

AS OF MAY 1, 1965

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

## GALLATIN RIVER

10D14	Arch Falls	7350	5/1	44	16.8	15.5	-
11D09	Bear Basin	8150	4/30	64	27.9	25.2	-
10D15	Bridger Bowl	7250	4/29	77	35.2	-	-
10D04	Devil's Slide	8100	5/1	77	32.0	27.0	24.9
10D03	Hood Meadow	6600	5/1	27	10.0	12.1	6.6
11D10	Little Park	7400	4/30	50	19.0	19.4	-
11E06	Twenty-One Mile	7150	4/28	55	24.9	18.6	14.9

## MISSOURI RIVER (Main Stem)

11C01	Boulder Mountain	7950	4/27	64	23.4	-	-
12C05	Chessman Reservoir	6200	4/28	8	2.2	7.4	2.9
10C07	Elk Peak	8000	4/28	67	26.8	21.2	-
10C02	Grasshopper	7000	4/28	21	7.4	8.6	-
10C01	Kings Hill	7500	4/28	52	18.4	18.8	13.8
12C01	Stemple Pass	6600	4/27	43	14.2	14.2	9.8
12C02	Ten Mile Lower	6600	4/28	20	6.8	9.1	4.1
12C03	Ten Mile Middle	6800	4/28	41	15.0	14.5	9.9
12C04	Ten Mile Upper	8000	4/28	53	21.0	19.0	14.2

## SUN-TETON-MARIAS RIVERS

13A15	Badger Pass	6900	5/3	106	50.0	46.4	-
12B06	Cabin Creek	5200	5/3	0	0.0	0.0	-
12B09	Five Bull	5700	4/27	24	9.0	6.6	-
12A01	Freight Creek	6000	4/26	52	23.6	19.6	-
12B07	Goat Mountain	7000	4/30	42	16.0	12.6	10.3*
12B01	West Fork	6000	4/26	52	23.2	18.3	-
12B04	Wrong Creek	5700	5/3	28	14.1	17.4	-
12B03	Wrong Ridge	6800	5/3	59	30.9	25.6	-

## JUDITH RIVER

10C06	Spur Park	8000	4/29	74	29.7	27.2	-
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# SNOW SURVEY DATA

AS OF MAY 1, 1965

(Inches)

SNOW COURSE			CURRENT DATA			PAST RECORD	
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH	WATER CONTENT	WATER CONTENT	
						LAST YEAR	AVERAGE

## SASKATCHEWAN RIVER

13A03	Iceberg Lake No. 3	5600	5/4	69	34.8	39.4	29.6
13A14	Josephine Lower No. 9	4900	5/3	46	19.6	19.3	17.9*
13A07	Mount Allen No. 7	5700	5/3	96	45.6	50.8	49.2
13A06	Piegan Pass No. 6	5500	5/3	86	43.3	45.2	41.3
13A08	Ptarmigan No. 8	5800	5/4	92	46.8	46.6	40.3

## UPPER YELLOWSTONE RIVER

10C05	Bald Ridge	7500	4/28	46	18.0	-	-
9D01	Camp Senia	7890	5/3	33	10.8	15.0	9.3*
10E03	Canyon	7750	4/30	53	24.7	16.0	13.5*
10E06	East Entrance	7000	5/2	11	2.7	4.7	3.6*
9D05	Grizzly Peak	8400	4/29	68	23.8	24.8	-
10D06	Independence	8000	4/26	64	27.0	18.8	17.7*
10E04	Lake Camp	7850	4/29	36	13.4	7.0	7.2*
9E01	Lodgepole	8200	4/29	38	12.1	11.3	10.7*
10E01	Lupine Creek	7300	5/3	24	8.2	8.2	7.4*
10D12	Monument Peak	9000	4/26	94	37.3	29.6	26.4*
10D07	Northeast Entrance	7400	5/1	24	10.2	8.2	6.2
10C03	Porcupine R. S.	6500	4/28	33	11.5	-	-
10D10	Sacajawea	6550	4/29	40	17.2	17.0	10.8*
10C08	South Fork Shields	8100	4/28	86	36.4	-	-
10E05	Sylvan Pass	7100	5/1	40	15.2	11.1	10.6*
9D04	Timberline Creek	8850	5/3	65	25.2	23.8	16.7*



# SOIL MOISTURE DATA

AS OF MAY 1, 1965

(Inches)

SOIL MOISTURE STATION			SOIL PROFILE		CURRENT DATA		PAST RECORD	
NO.	NAME	ELEVATION	DEPTH	FIELD CAPACITY	DATE OF SURVEY	SOIL MOISTURE	LAST YEAR	**AVERAGE

## COLUMBIA RIVER BASIN

### Kootenai

15B15M	Baree Trail	3800	48	7.5	4/20	6.7	-	-
14A10M	Murphy Lake R. S.	3000	48	22.6	5/3	23.0	-	-
15A02M	Raven R. S.	3050	48	23.0	4/29	22.0	-	-

### Flathead

13A02M	Desert Mountain	5600	54	8.4	4/27	9.6	6.8	8.2
13A05M	Marias Pass	5250	54	6.5	4/30	6.4	5.4	6.0

### Clark Fork

13C15M	Georgetown Lake	6450	48	9.0*	4/29	5.1	4.5	-
13B19M	Seeley Lake	4030	48	11.9*	5/3	12.0	11.9	-
13C02M	Skalkaho Summit	7260	48	10.8	4/27	9.7	-	-

### Bitterroot

13D18M	Gibbons Pass	7100	48	7.1	4/30	7.9	6.1	-
14C05M	Lolo Pass	5250	48	10.6*	4/27	9.4	5.5	-

## MISSOURI RIVER BASIN

### Beaverhead

11E13M	Lakeview	6700	48	15.3	5/5	16.5	14.8	-
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### Madison

10D04M	Red Bluff	4800	40	4.7	4/30	2.6	3.5	-
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### Gallatin

11D02M	College Site	4856	54	14.5	4/30	13.2	12.5	12.1
11E06M	Twenty-One Mile	7150	48	8.8	4/28	3.6	3.6	-

### Missouri Main Stem

10C01M	Kings Hill	7420	48	11.8	4/29	7.8	8.2	-
12C08M	Stemple Pass	6350	48	5.9	4/29	5.3	5.6	-

### Yellowstone

10D11M	Battle Ridge	6020	48	17.6*	4/29	16.6	14.3	-
10D07M	Northeast Entrance	7350	48	9.4	4/30	7.4	8.2	-

\*\*AVERAGE FOR PERIOD OF RECORD

\*Revised



# RESERVOIR STORAGE DATA

AS OF APRIL 30, 1965

(1000 Acre Feet)

			USEABLE STORAGE			
BASIN	RESERVOIR	USEABLE CAPACITY	THIS YEAR	LAST YEAR	AVERAGE	
<u>COLUMBIA RIVER BASIN</u>						
Flathead	Hungry Horse	3,428.0	1,564.0	2,003.0	2,097.0**	
	Flathead Lake	1,791.0	1,132.0	770.7	968.0	
	Camas 1/	45.2	29.7	22.3	38.1	
	Mission Valley 2/	100.3	51.0	26.5	45.1	
Clark Fork	Georgetown Lake	31.0	22.0	25.5	21.2	
	Noxon Rapids	334.6		101.1	-	
Bitterroot	Como	34.9	24.5	8.1	17.9	
	Painted Rocks	31.7		25.4	22.0**	
<u>MISSOURI RIVER BASIN</u>						
Beaverhead	Clark Canyon	225.6	108.5	-	-	
	Lima	84.0	77.3	28.8	50.0**	
Ruby	Ruby	38.8	-	-	31.7**	
Madison	Hebgen Lake	384.8	198.8	224.6	174.8	
	Ennis Lake	41.0	25.0	38.6	34.9	
Gallatin	Middle Creek	8.0	4.1	5.0	4.6**	
Missouri	Canyon Ferry	2,043.0	1,589.0	1,741.0	1,577.4**	
	Hauser & Helena	61.9	58.4	63.0	50.1	
	Lake Helena	10.4	9.2	10.9	6.6	
	Holter Lake	81.9	69.0	66.2	61.8	
	Smith River	10.7	11.4	9.0	8.3**	
	Ackley Lake	5.8		2.8	3.9	
	Durand	7.0	7.0	5.6	5.9	
	Martinsdale	23.1	10.6	8.1	10.6	
	Deadman's Basin	72.2	59.2	59.2	45.1**	
	Fort Peck	19,410.0	15,950.0	11,920.0	11,128.6	
	Sun	Gibson	105.0	58.8	22.1	65.7
		Willow Creek	32.3	19.5	21.5	22.5
		Pishkun	32.0	21.1	17.0	23.5
	Marias	Lower Two Medicine	16.6		2.2	0.8
Four Horns		19.2		13.4	10.8	
Swift		30.0		14.1	26.7	
Lake Frances		112.0		37.2	95.8	
Milk	Tiber	1,313.0	815.5	632.9	656.3**	
	Fresno	127.2	134.9	58.4	108.1	
	Nelson	66.8	40.3	26.9	39.8	
	Lake Sherburne	66.1	28.7	-	24.8	
Yellowstone	Mystic Lake	20.8	1.6	3.5	2.8	
	Tongue River	68.0		40.5	20.4	
	Cooney	27.5	11.2	23.0	15.0**	

1/ Sum of four small reservoirs on west side of Flathead Lake.

2/ Sum of eight small reservoirs in Mission Valley not including Jocko Lake.





## Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service  
Region I, Missoula, Montana

U. S. Geological Survey  
Helena, Montana

U. S. Army Corps of Engineers  
Portland, Oregon  
Seattle, Washington  
Omaha, Nebraska

U. S. Indian Irrigation Service  
St. Ignatius, Montana

U. S. Weather Bureau  
Helena, Montana

U. S. Bureau of Sports Fisheries  
and Wildlife  
Red Rock Lakes Refuge  
Monida, Montana

U. S. Bureau of Reclamation  
Billings, Montana  
Boise, Idaho

Montana Power Company  
Butte, Montana

Agricultural Experiment Station  
North Montana Branch Station  
Havre, Montana

State Water Conservation Board  
Helena, Montana

National Park Service  
Yellowstone National Park  
Glacier National Park

Montana Experiment Station  
Montana State College  
Bozeman, Montana

Bonneville Power Administration  
Portland, Oregon

Montana State University  
School of Forestry  
Missoula, Montana

Soil Conservation Service  
Montana, Wyoming, Idaho

Soil and Water Conservation Districts  
Montana Counties

Johnson Flying Service, Inc.  
Missoula, Montana

Water Rights Branch, Dept.  
of Lands and Forests  
Victoria, British Columbia

Department of Northern Affairs  
and National Resources  
Calgary, Alberta

State Engineer  
Helena, Montana



# *Montana's* **SNOW HARVEST**

SCENIC SNOW-FED ROCK CREEK, SOUTH OF  
RED LODGE, NOTED FOR BOTH IRRIGATION  
AND FISHING.

11-306



*The Story of*  
**COOPERATIVE  
FEDERAL! STATE - PRIVATE  
SNOW SURVEYS AND  
WATER SUPPLY FORECASTS**

INTO MOUNTAIN SNOW  
PACK AREAS SURVEY-  
ORS TRAVEL BY RADIO  
EQUIPPED OVERSNOW  
VEHICLES

11-9443-4

---OR AFOOT ON  
SNOWSHOES OR  
SKIS.



11-9357-3

MAPPED SNOW COURSES  
THEY SEEK AND MEASURE  
ARE MARKED BY YELLOW  
SIGNS.

SSS-02

SNOW SURVEYORS CHECKING SNOW DEPTH AND  
TAKING SAMPLE. SCALE ON SKI POLE WILL WEIGH  
WATER CONTENT OF SNOW.

SS4-11





## SNOW SURVEYS

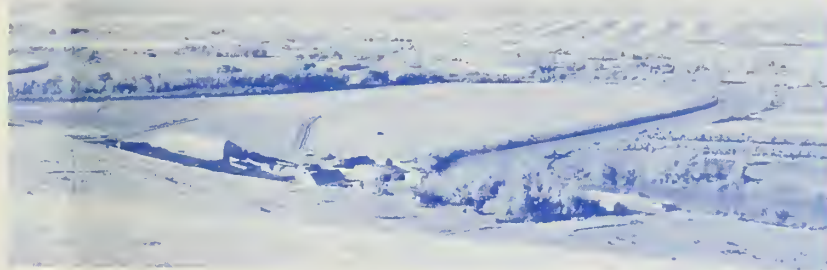
Montana's annual snow harvest is worth much -- even in terms of money. Considered by many a hindrance to travel, a menace to man and animal or a delightful medium for fun -- such as skiing -- snow is actually a major factor in Montana's economy.

Most water in the West has its beginning as a snowflake falling gently on a timbered watershed. It matures into a droplet and with other droplets may be used to generate electricity, irrigate crops, quench thirst, drive industry, provide habitat for fish, produce lumber or become part of a wilderness lake.

The supply of water varies year to year, depending on how much snow accumulates in higher elevations -- how great the winter snowpack becomes.

Each winter month, pairs of snow surveyors travel deep into mountain snowpack areas to measure snow accumulation at locations called "snow courses." With specially built aluminum tubes, they measure snow depth and remove a core of snow which is weighed to determine how much water it contains. Each such snow course usually has 10 sampling stations. Snow depth and snow water equivalent (water content) are averaged and this is reported as the measurement for the course.

The U.S. Department of Agriculture Soil Conservation Service has the responsibility for coordinating snow

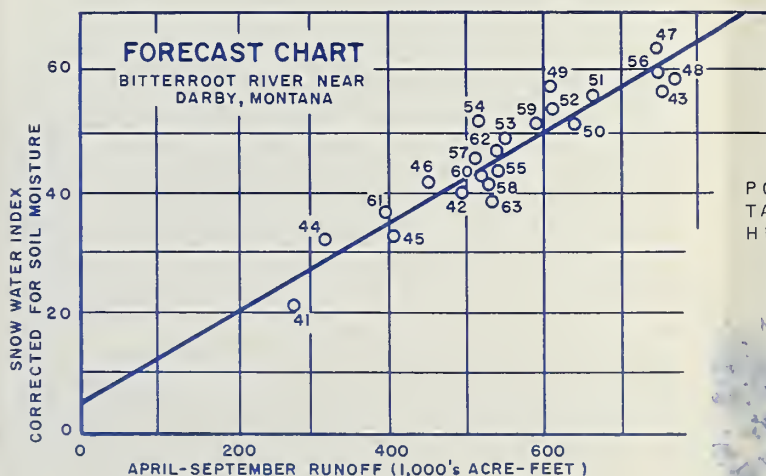


GOOD SOIL AND WATER MANAGEMENT BASED ON RELIABLE FORECASTS ARE EXEMPLIFIED BY THIS SUN RIVER FARM. 11-3066-4

SNOW SURVEY - BASED WATER FORECASTS AID PLANNING AND OPERATION OF RESERVOIRS SUCH AS THIS ON LOWER WILLOW CREEK. 11-7801-4



surveys in Montana. Assisting, either through funds or services are the Montana Agricultural Experiment Station, U.S. Forest Service, U.S. Geological Survey, U.S. Indian Irrigation Service, U.S. Bureau of Sport Fisheries and Wildlife, U.S. National Park Service, Montana Power Company, State Water Conservation Board, Montana State University School of Forestry and other private and public organizations.



POWER FROM A MIGHTY RIVER IS MORE PREDICTABLE AND MANAGEABLE THROUGH SNOW SURVEYS. HUNGRY HORSE DAM, FLATHEAD RIVER.

MEASUREMENTS OVER SEVERAL YEARS PROVIDE DATA WHICH CAN BE PLOTTED ON GRAPH FROM WHICH SEASONAL RUNOFF CAN BE PREDICTED.





## STREAMFLOW FORECASTS

Snow survey data are used to forecast streamflow -- 70 to 80 per cent of the spring and summer runoff via mountain streams comes from snow melt. By consulting previous snow survey and streamflow records, trained personnel can make reliable estimates of a coming runoff as much as six months in advance. Measurements of soil moisture under the snowpack and subsequent precipitation add to accuracy of these predictions. Generally a forecast equation is developed by statistical methods for analyzing various types of data.

*This information along with snow survey, soil moisture and reservoir storage data is published in water supply outlook reports and bulletins and mailed to water users and others interested in water supply.*

Reports covering the entire state of Montana are published near the first of each month, January through June. Watershed reports covering smaller areas are published March 1, April 1 and May 1.

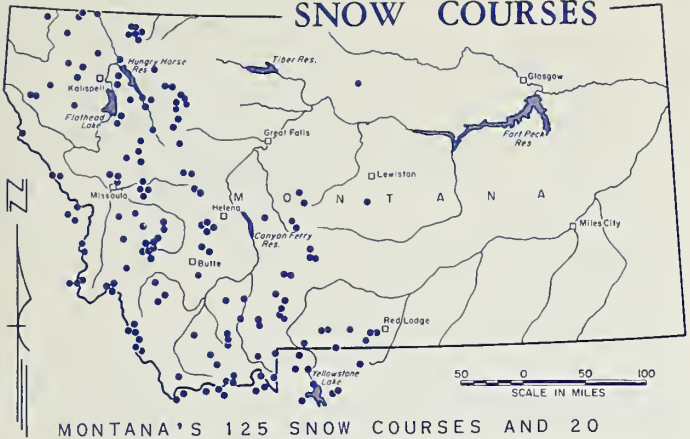
*Reliable forecasts of spring and summer runoff help many Montanans directly and almost everyone indirectly. Reservoirs, whether for irrigation, power, flood control or multipurpose, operated on the basis of water supply forecasts, can bring about maximum use of both stored and runoff water volumes. Farmers can determine, beforehand, which crop plantings are most suitable for the water supply available. Transportation companies can anticipate production from irrigated lands -- and hence the transportation requirements. Others, including agricultural loan firms and agencies, municipal water supply agencies and power generating companies or districts can plan operations to fit the expected supply of water.*

Of all natural resources in Montana, water is one of the most valuable -- and the snowpack is major source of that water. Snow surveys provide invaluable advance information on each year's potential supply.

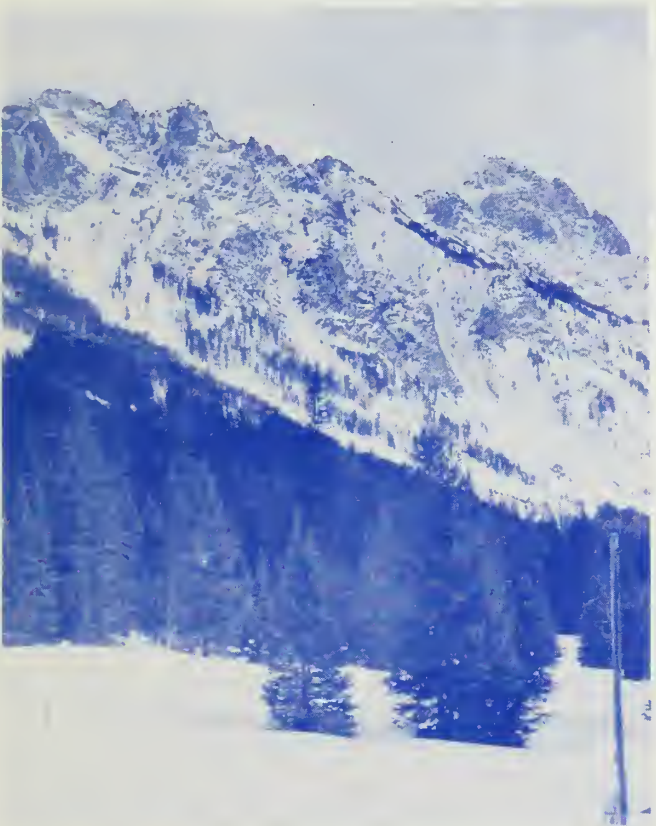
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*Current information on snow survey and water supply forecasting is available from the Snow Survey Supervisor, Box 855, Bozeman, Montana.*

# SNOW COURSES



MONTANA'S 125 SNOW COURSES AND 20 SOIL MOISTURE STATIONS PROVIDE DATA FOR STREAMFLOW FORECASTS. 11-799



U.S.  
Department of Agriculture  
SOIL CONSERVATION  
SERVICE

33 E. Mendenhall  
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*"The Conservation of Water begins  
with the Snow Survey"*

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